FINAL REPORT

Corrective Measures Study
Interim Report
Performance Monitoring Update & Pilot Test Plan

GE Aviation – Evendale Facility
Evendale, Hamilton County, Ohio

June 2015

O'BRIEN & GERE

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Corrective Measures Study Interim Report Performance Monitoring Update & Pilot Test Plan

GE Aviation – Evendale Facility
Evendale, Hamilton County, Ohio

Prepared for: GE Aviation

June 2015

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1. INTRODUCTION

The USEPA-approved CMS Work Plan, dated May 2014 for the GE Aviation facility in Evendale, Ohio outlines several interim submittals prior to completion of the site-wide CMS (O'Brien & Gere, 2014). This document provides an update to performance monitoring results since initiation of the groundwater Interim Remedial Measure (IRM). The performance results provide the basis for performing a pilot test on two recovery wells (EW-7S and EW-8D) as described in the CMS Work Plan. The performance monitoring results will also be used in the development of groundwater Corrective Measures Objectives (CMOs), to be addressed under a separate interim submittal per the CMS Work Plan.

The following sections provide an updated summary and evaluation of key findings from IRM Groundwater Extraction System (GWES) operation and monitoring data since system startup. The summary is followed by an evaluation of existing groundwater hydraulic and chemical conditions in the vicinity of EW-7S and EW-8D. This evaluation was conducted as an initial step in development of a CMS pilot test to examine the planned shutdown of extraction wells EW-7S and EW-8D. Details of the planned pilot testing are provided at the end of this document.

2. BACKGROUND

In July 2011, GE initiated operation of an IRM groundwater extraction system (GWES) at the southern (downgradient) portion of the GE Aviation manufacturing facility (**Figure 1**) in Evendale, Ohio. The GWES was implemented to mitigate the off-site migration of compounds of potential concern (COPCs), primarily chlorinated volatile organic compounds (CVOCs), without exacerbating aquifer conditions. O'Brien & Gere continues to evaluate the effectiveness of the groundwater IRM in accordance with the USEPA-approved Performance Monitoring Plan (PMP) (O'Brien & Gere, 2010).

Over the nearly four years of GWES operation, monitoring has progressed from Hydraulic Control Monitoring to the current Progress Monitoring phase. As noted in the 2014 Annual Groundwater Monitoring Report (O'Brien & Gere, 2015), statistical results from influent concentrations conducted according to the PMP and DQO process suggest an evaluation of continued pumping/system optimization be conducted. This would include extraction wells EW-7S/EW-8D which are the subject of CMS pilot testing activities as discussed later in this document.

The Data Quality Objectives (DQO) planning process utilized in development of the PMP was adapted to facilitate monitoring plan development for decisions that may be several years in the future. Flexibility continues to be maintained to allow for modifying the sampling and analysis scheme over time (*e.g.*, location, frequency, and analytical parameters). Following the development of CMOs, the final phase of Closure Monitoring will be developed with the purpose of verifying CMO attainment, supporting decisions on permanent shutdown of pumping and continued implementation of a long-term MNA program.

3. IRM SYSTEM OPERATIONS SUMMARY AND EVALUATION

Since startup on July 11, 2011, the IRM GWES continues to be monitored in accordance with the USEPA-approved PMP, including IRM performance monitoring (influent and effluent concentrations), and groundwater quality and hydraulic (water level) monitoring. The following provides a summary for the IRM GWES operations from July 11, 2011 through April 10, 2015.

3.1 GROUNDWATER EXTRACTION

- The system operated for a total of 1,276 days or 93% of the time since startup, with short-term periods of shut down for routine maintenance. Longer-term system shut downs occurred for other maintenance issues, with the longest shut down from October 14, 2013 until November 21, 2013 due to post-maintenance air stripper tray alignment and performance issues.
- The average operational IRM GWES flow rate was approximately 288 gallons per minute (gpm) since startup, with the average operational flow rates from each water-bearing zone as follows:

  - Perched Zone extraction system[1]:
    - EW-2P: 46.3 gpm
    - EW-4P: 36.3 gpm
    - EW-5P: 35.1 gpm
    - EW-6P: 48.0 gpm
  - USG extraction well EW-7S: 32.4 gpm
  - LSG extraction wells EW-3D and EW-8D: 49.2 gpm each[2]
- A total of 528 million gallons of groundwater were extracted by the IRM GWES since startup
- USG extraction well EW-7S continues to operate, but at a reduced average pumping rate of 5 gpm thereby maintaining a reduced capture zone within the USG. Well EW-7S was redeveloped in January 2012 and June/July 2013 to restore its well capacity. However, the well capacity was not restored effectively after the second redevelopment, indicating potential fouling of the sand pack or formation at this well location.

3.2 EXTRACTION WELL WATER QUALITY AND PERFORMANCE

Water quality data for the IRM GWES extraction wells, as well as system influent and effluent data, were collected and used to create tabular and graphical water quality data summaries. The data were subjected to trend and statistical analysis to evaluate IRM GWES optimization and effectiveness. The data generally indicate:

- Steady state or decreasing concentrations in CVOCs, with fluctuations associated with plume movement within the system capture zone
- Decreases in extraction well concentrations for individual constituents indicate that IRM GWES optimization may be evaluated at this time.
- CVOC concentration increases in EW-7S since Third Quarter 2014 are associated with the reduced pumping rate, the reduction in the capture zone, and the removal of lower volumes of higher concentration groundwater near the EW-7S location.

3.3 GROUNDWATER ELEVATIONS AND QUALITY

Groundwater elevation and monitoring well water quality data were collected and used to create hydrographs, calculate vertical hydraulic gradients between select nested wells, and create tabular and graphical water quality data summaries for trend and statistical analysis. The results of these analyses were used to (1) evaluate the occurrence of cross-contamination and equilibrium conditions, (2) estimate the groundwater flow paths and capture zone of the extraction wells, and (3) measure remedial progress. Results indicate the following:

- No significant trends in vertical hydraulic gradients indicative of vertical cross-contamination
- Active pumping continues to:
  - Maintain the depression of groundwater levels and steady-state conditions established in 2011 in the Perched and LSG, supporting a continuation of Progress Monitoring, and
  - Reverse the regional downward gradient between the Perched Zone and USG near the Perched Zone extraction wells.

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[1] Perched Zone extraction wells EW-5P and EW-2P were shut down for extended periods of time in 2013 and 2014, respectively due to pump failures requiring replacement. The three other Perched Zone well extraction rates were increased during the shutdown of EW-5P to maintain the Perched Zone capture zone. Currently EW-6P is experiencing pump failure issues and will likely need to be shutdown and replaced in 2015

[2] Note: the total of the individual well extraction rates is greater than the average system extraction rate because not all pumps were operating at same time due to individual well maintenance issues

- Maintain the capture zones in the Perched Zone and LSG that approximate, or are greater than, the designed capture zones.

- In the USG (EW-7S) the capture zone decreased to less than designed as a result of pumping rate reduction in this extraction well. In addition, the reversal of the regional downward gradient is maintained only in close proximity to USG extraction well EW-7S. However, concentrations in nearby USG monitoring wells AF-11S and OSMW-4S have remained relatively stable even with the reduction in the EW-7S pumping rate.
- The field bioparameter data have been relatively stable since pumping began and do not appear to indicate cross-contamination or a reduction in the effectiveness of biodegradation processes within the Perched Zone, USG and LSG.
- Groundwater quality data and associated intrawell statistical analyses do not show significant trends in VOC concentrations indicative of cross-contamination, based on nested wells completed in the Perched Zone, USG and LSG units. Continued monitoring of the following wells will be conducted to reduce the likelihood of inducing cross-contamination within or between units:
  - Monitoring wells AF-7P, OSMW-1S/D, OSMW-3D, OSMW-6D, OSMW-8S/D, OSMW-9S/D, OSMW-10S/D, PMW-3P/S/D and TMW-2D.

Groundwater will continue to be monitored according to the PMP to evaluate the effectiveness of the IRM GWES to mitigate the off-site migration of COPCs, and to meet the objective of protecting potential receptors through off-site natural attenuation. Depending on the timing and approval of long-term media cleanup objectives, existing concentrations in extraction wells and surrounding monitoring wells may indicate that continuous pumping from select extraction wells can be discontinued and replaced with long-term MNA.

4. ANALYSIS OF IRM DATA FOR EW-7S AND EW-8D

Diminished well capacity and pumping rate at EW-7S further indicate the need to evaluate options for optimization, including modification of the pumping sequence or discontinuation of pumping. Because of the influence of pumping at EW-8D on vertical hydraulic gradients, this extraction well is also included in the following analysis. As outlined in the 2014 CMS Work Plan, pilot testing will be conducted to evaluate whether continued pumping of extraction wells EW-7S and EW-8D is beneficial. A review of existing IRM pumping, water level, and water quality data were evaluated to assist in developing the pilot testing plan. The evaluation included:

- Well pumping level and recovery data to characterize the hydraulic characteristics of the water-bearing zone in the vicinity of EW-7S,
- Water level data in the vicinity of EW-7S and EW-8D to evaluate relationships between pumping and vertical hydraulic gradients, and
- Groundwater quality from extraction well effluent and nearby monitoring wells to evaluate the relationships between pumping and CVOC concentrations in the USG and LSG.

Data analysis focused on periods of EW-7S pumping and extended shutdown as a preliminary indicator of the response of impacted groundwater due to shutdown. The findings of these analyses are summarized below to provide the basis for data to be collected during the pilot testing program.

4.1 HYDRAULIC CHARACTERISTICS OF THE USG AND LSG

The water level data collected by the monitoring network during the shutdown of the IRM GWES from October 14, 2013 until November 21, 2013 and subsequent startup of the system allowed the evaluation of the hydraulic conductivity and storage coefficient in both the USG and LSG units in the area of EW-7S and EW-8D. Pumping tests conducted in the USG and LSG during the design of the IRM were performed using wells located on the eastern area of former AFP36 near monitoring wells AF-7S in the USG and EW-3D in the LSG. IRM shutdown and startup data collected from EW-7S were analyzed using the Hantush-Jacob recovery test and the Theis drawdown pumping test methods, respectively. The results of these analyses are summarized in **Table 1**.

Results of aquifer parameters derived during the IRM design pumping tests are also in **Table 1**. A comparison of the pumping test data indicates the following:

- The USG and LSG hydraulic conductivities in the western portion of the site were approximately 50 to 75% less than those observed on the eastern portion of the site.
- Storage coefficients for both the USG and LSG were an order of magnitude higher than those calculated for the eastern portion of the site. The storage coefficients indicate that the USG and LSG have increased leakage from the surrounding low permeability units along the western portion of the site.
- The lower transmissivity in the western area of the site would partially explain the reduced well capacity of EW-7S. However, the significant reduction in well capacity observed is believed to be a result of plugging of the well sandpack and/or formation.

Analyses of actual pumping test data from the area of EW-7S and EW-8D provide a basis for understanding conditions of the water-bearing units in this area and allow proper planning of data acquisition during the proposed pilot testing.

4.2 ANALYSIS OF PUMPING AND VERTICAL HYDRAULIC GRADIENTS

A downward vertical hydraulic gradient generally exists between water-bearing zones beneath the facility, with the magnitude of the natural (non-pumping) head difference between the USG and LSG units in the south area ranging between about a tenth of a foot to over two feet. In the EW-7S and EW-8D area, the head difference is only about a tenth of a foot without pumping, which results in downward vertical gradients of approximately 0.002 to 0.003 ft/ft. The pumping of both EW-7S and EW-8D results in a reversal in the vertical gradient, as opposed to pumping only EW-8D, which would cause a greater downward vertical gradient and increase the potential for vertical migration of impacted groundwater. Due to the interrelated effects of pumping EW-7S and EW-8D, both extraction wells were included in the analysis.

Using existing data, an analysis of the hydraulic head difference between the USG and LSG during extraction well pumping was conducted. With pumping from EW-8D held at a constant rate of 50 gpm, the hydraulic head difference was evaluated at EW-7S operating pumping rates of 50 gpm and 35 gpm, using hydraulic data from nearby nested monitoring wells AF-11S/D and OSMW-4S/D (**Figures 2 and 3**) . A summary of the data is as follows:

Pumping Well	Pumping Rate (gpm)	Head Difference (ft)	Direction	Vertical Hydraulic Gradient (ft/ft)
EW-7S	50	0.4	Upward	0.007 – 0.01
EW-7S	35	0.15	Upward	0.002 – 0.004
Note: EW-8D pumping rate maintained at 50 gpm				

Using linear regression analysis of the hydraulic data, the following minimum “break-even” pumping rates for EW-7S were projected:

- At an EW-7S pumping rate of 26 gpm there would be no upward gradient cause by the pumping,
- At an EW-7S pumping rate of 20 gpm the vertical gradient would be equivalent to the non-pumping (natural) downward vertical gradient, and
- At an EW-7S pumping rate of less than 20 gpm, an increased downward vertical gradient would be caused by the continued pumping of EW-8D.

In summary, the existing data indicate that, at an EW-7S pumping rate of 20 gpm the vertical gradient during pumping would be equivalent to the non-pumping (natural) downward vertical gradient; and at lower EW-7S pumping rates there would be enhanced downward vertical gradients caused by the continued pumping of EW-8D.

4.3 ANALYSIS OF PUMPING AND CVOC CONCENTRATIONS

The analyses also included a comparison with CVOC concentration data collected from the extraction well effluent and from nearby monitoring wells.[3] Several trends and relationships were identified and are summarized for EW-7S and EW-8D below.

4.3.1 EW-7S

The following observations between the EW-7S pumping rate and CVOC concentrations in the extraction well effluent (**Figures 4 and 5**) are:

- Effluent concentrations decreased with time as the well was pumped, until the average pumping rate decreased to less than about 20 gpm, indicating a response typical to the pumping and flushing of CVOCs from within the capture zone.
- Effluent concentrations appear to increase or rebound after adjustments (decreases) in the EW-7S extraction rate or shutdowns of EW-7S. This was observed after the shutdown in October/November 2013 where the concentrations increased/rebounded from approximately 160 µg/l to 370 µg/l. These concentrations were then removed from the groundwater system with continued pumping.
- EW-7S concentrations increased in response to the decreased pumping rates. The increased concentrations are believed to be due to a reduced capture zone that resulted in:
  - Less removal volume (higher resulting pore water concentrations with rebound, due to greater diffusion), and/or
  - More concentrated portion of the plume being captured.
- CVOC concentrations in immediately downgradient well OSMW-4S (**Figure 6**) appear to show a marked reduction in concentrations after the startup of the EW-7S, in response to the continued pumping of EW-7S and associated plume capture/remediation.
- CVOC concentrations in AF-11S increased about 8 months after the startup of EW-7S, but then fluctuated in response to changes in EW-7S pumping and effluent concentrations, before decreasing over the last two quarterly sampling events.

4.3.2 EW-8D

The following observations between the EW-7S and EW-8D pumping rates and the effluent CVOC concentrations of EW-8D (**Figure 7**) are:

- Effluent concentrations of EW-8D decreased with time as both EW-7S and EW-8D were pumped.
- Effluent concentrations in EW-8D fluctuated after adjustments in the EW-8D extraction rate.
- There does not appear to be a relationship between the pumping rates of EW-7S and the effluent concentrations in EW-8D, except that the most recent sampling events showed a slight increase in CVOC concentrations in EW-8D.
- After the October/November 2013 system shutdown, the effluent concentrations rebounded in EW-7S, but not in EW-8D.
- CVOC concentrations in OSMW-4D (**Figure 8**) appear to have responded to the pumping of EW-8D, initially decreasing after pumping began, but then increased through November 2012, and followed an overall decreasing trend since that time period.
- Concentration trends in OSMW-4D do not appear to be related to pumping of EW-7S (**Figure 9**).

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[3] Direct comparison of data is not as consistent as expected due to timing of extraction well effluent samples (monthly basis) and monitoring well samples (quarterly) in relation to the time of occurrence and duration of system shutdown and re-starts. In addition, the limited number of samples also influences the ability to evaluate the relationship between pumping rate changes and CVOC concentrations.

5. EXTRACTION WELL PILOT TESTING

Based on a review of the existing pumping, hydraulic, and groundwater quality data, data gaps have been identified that are primarily associated with the inability to adjust test durations and to target the specific timing of data collection and sampling activities. As a result, a pilot test will be conducted that is designed to address these data gaps and consists of two parts:

- Pulse pumping test for well EW-7S to evaluate improved effectiveness
- Shutdown test for well EW-8D to evaluate the potential for rebound & advantages/disadvantages of a well shutdown.

5.1 EW-7S PILOT TESTING

The following data collection and pilot testing efforts will be conducted (**Table 2**):

- Evaluate the existing well specific capacity of EW-7S, which is likely affected by well borehole and surrounding aquifer fouling, using the following approach:
  - » Cycling EW-7S off and on over a 3.5 day interval for at least two consecutive cycles (*i.e*., two consecutive weekends) to observe the extent of recovery in the specific capacity following the off cycling.
  - » If there is no noticeable or lasting increase in the specific capacity after the first two weeks of cycling, then the well will be turned off for two weeks, and then turned back on for one week. Up to two, three-week cycles will be performed.
  - » Shutdown EW-7S for up to 8 weeks to determine whether shutdown has a noticeable effect on the nearby vicinity of the USG and LSG (up to two cycles will be performed).
- Collect and analyze effluent samples from EW-7S and EW-8D prior to each shutdown and within 15 minutes of each startup to evaluate the effect of the shutdowns on the effluent concentrations.
- Collect and analyze groundwater samples from AF-11S/D and OSMW-4S/D utilizing low flow sampling techniques prior to each two week or longer shutdown and restart.
- Download the hydraulic data collected by the transducers in monitoring wells AF-11S/D and OSMW-4S/D during pilot testing.

5.2 EW-8D PILOT TESTING

Following the cycle testing of EW-7S, EW-7S will remain shutdown, and a shutdown test for well EW-8D (Table 2) will be conducted for a 6 to 8 week period. This testing will be repeated for an extended time up to 16 weeks depending on the results of the initial cycling. Details are:

- Collect and analyze effluent samples from EW-8D prior to shutdown and within 15 minutes of each startup to evaluate the effect of the shutdowns on the effluent concentrations,
- Collect and analyze samples from AF-11S/D and OSMW-4S/D utilizing low flow sampling techniques prior to each shutdown and restart, and
- Download the hydraulic data collected by the transducers in monitoring wells AF-11S/D and OSMW-4S/D during the pilot testing.

5.3 DATA EVALUATION

Data collected during the pilot test will be evaluated to address key study questions and decision points outlined in the PMP:

- The hydraulic interaction between the USG and LSG,
- The effect of pumping EW-7S on CVOC concentrations for nearby wells within the USG and LSG,
- The effect of shutting down EW-7S on a long-term basis, while EW-8D remains operational, and

- The effect of shutting down both EW-7S and EW-8D, potentially on a permanent basis.

The pilot test study report will include a summary of background information, methodology, data analysis, and conclusions, and will be included as an appendix to the CMS Report. Key findings from the pilot test will be provided to USEPA during quarterly progress reporting.

6. REFERENCES

O'Brien & Gere, 2010. IRM Performance Monitoring Plan. GE Aviation, Evendale, Ohio. December 2010.

O'Brien & Gere, 2014. Corrective Measures Study Work Plan. General Electric Aviation, Evendale, Ohio. May 2014.

O'Brien & Gere, 2015. Groundwater IRM, Groundwater Monitoring Report – 4th Quarter and Annual Summary 2014. GE Aviation, Evendale, Ohio. April 2015.

Tables

IRM System Shutdown and Startup Pumping Test Results

USG AQUIFER

Well ID	Solution Method	Transmissivity ft^2/day	Aquifer Thickness ft		Hydraulic Conductivity ft/day	Storage Coefficient
AF-9S	Theis	7210.9	36.5 *		197.6	0.00927
	Hantush-Jacob	5760.0	36.5 *		157.8	--
AF-11S	Theis	6998.2	25		279.9	0.0306
	Hantush-Jacob	5305.3	25		212.2	--
AF-19S	Theis	6445.6	14		460.4	0.00601
	Hantush-Jacob	6027.0	14		430.5	--
OSMW-4S	Theis	6087.4	26		234.1	0.0835
	Hantush-Jacob	4950.4	26		190.4	--
	Arithmetic Mean	6098.1	--	**All Data**	270.4	0.0323
	Geometric Mean	6054.4	--	**All Data**	252.2	0.0194
	Standard Deviation	777.8	--	**All Data**	114.0	0.0358
			IRM Design Pumping Test Results		*800.0*	*0.0002*

LSG AQUIFER

Well ID	Solution Method	Transmissivity ft^2/day	Aquifer Thickness ft		Hydraulic Conductivity ft/day	Storage Coefficient
AF-9D	Theis	7119.6	102 *		69.8	0.0926
	Hantush-Jacob	7956.0	102 *		78.6	--
AF-11D	Theis	6158.6	83 *		74.2	0.0954
	Hantush-Jacob	8017.8	83 *		96.6	--
AF-19D	Theis	7956.0	102 *		78.0	0.00419
	Hantush-Jacob	8293.0	102 *		81.3	--
OSMW-4D	Theis	8607.1	83		103.7	0.113
	Hantush-Jacob	8798.0	83		106.0	--
	Arithmetic Mean	7863.3	--	**All Data**	86.0	0.0763
	Geometric Mean	7819.3	--	**All Data**	85.1	0.0452
	Standard Deviation	854.5	--	**All Data**	14.0	0.0489
			IRM Design Pumping Test Results		*180.0*	*0.0060*

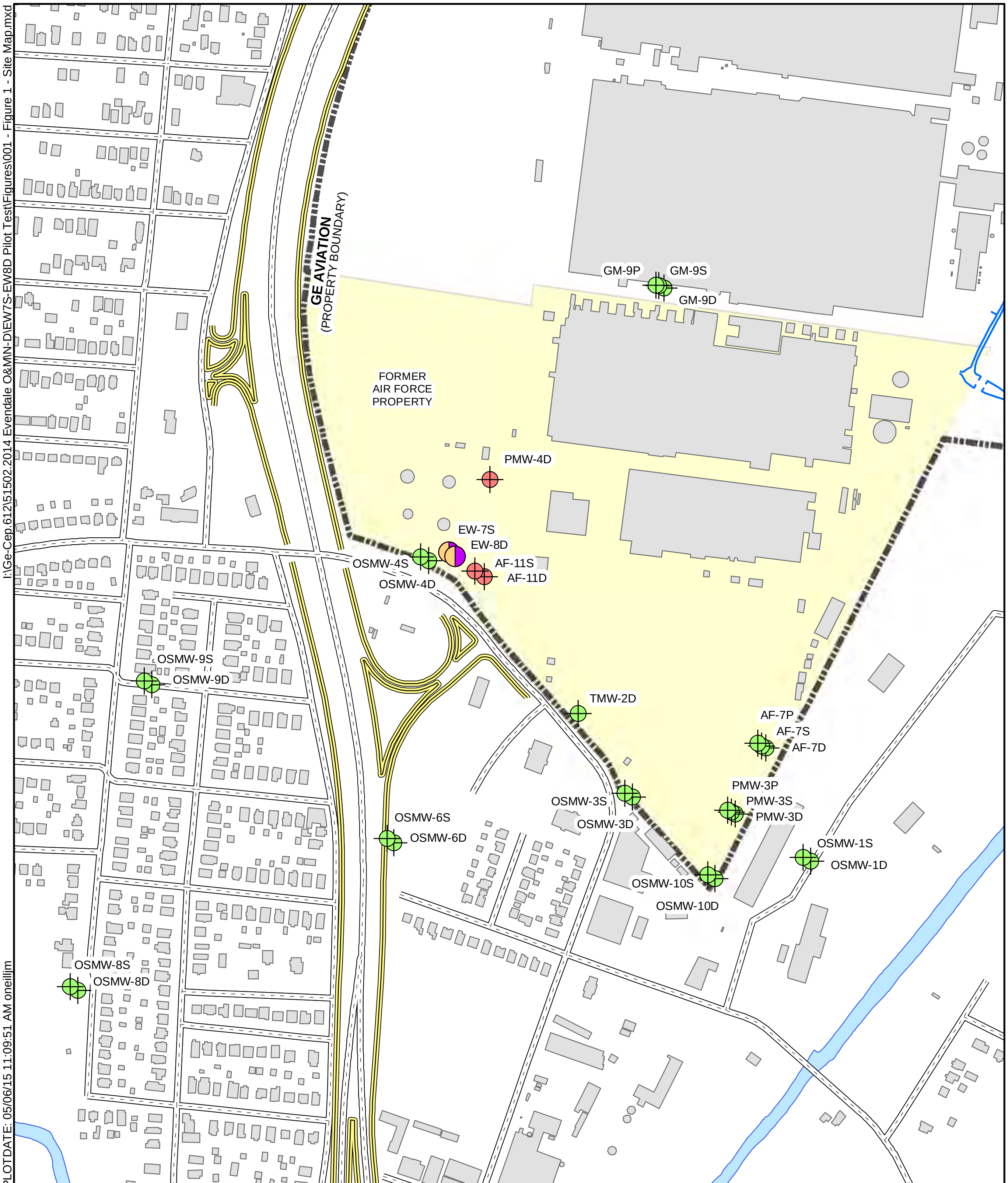
Note:

* Aquifer thickness estimated from nearby wells

IRM Pilot Test Summary

Pilot Test Activity	Event Time Interval	Time Interval of Complete Cycle	Number of Proposed Cycles	Accumulative Time Interval	Data Collection Efforts
Cycling EW-7S On/Off					
1) Initial Events					▪ Collect effluent samples from EW-7S and EW-8D prior to each shutdown and within 15 minutes of each startup to determine the effect of the shutdowns on the effluent concentrations ▪ Collect groundwater samples from AF-11S/D and OSMW-4S/D utilizing low flow sampling techniques prior to each shutdown and restart ▪ Download and evaluate transducer hydraulic data on a more frequent basis than quarterly during the pilot testing in monitoring wells AF-11S/D and OSMW-4S/D
Off	3.5 days				
On	3.5 days	7 days (1 week)	2	2 weeks	
2) Lengthened Cycling					
Off	2 weeks				
On	1 week	3 weeks	2	6 weeks	
3) Extended Cycling					
Off	up to 8 weeks				
On	Just long enough to collect samples	8 weeks	2	16 weeks	
Shutdown Testing of EW-8D					
1) Initial Event					▪ Collect effluent samples from EW-8D prior to each shutdown and within 15 minutes of each startup to determine the effect of the shutdowns on the effluent concentrations ▪ Collect groundwater samples from AF-11S/D and OSMW-4S/D utilizing low flow sampling techniques prior to each shutdown and restart ▪ Download and evaluate transducer hydraulic data on a more frequent basis than quarterly during the pilot testing in monitoring wells AF-11S/D and OSMW-4S/D
Off	6 to 8 weeks				
On	Just long enough to collect samples	6 to 8 weeks	2	12 to 16 weeks	
2) Extended Event					
Off	up to 16 weeks				
On	Just long enough to collect samples	up to 16 weeks	1	16 weeks	

Figures



I:\Ge-Cep.612\51502.2014 Evendale O&MN-D\EW7S-EW8D Pilot Test\Figures\001 - Figure 1 - Site Map.mxd

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LEGEND

- MONITORING WELL LOCATION (SAMPLE AND HYDRAULIC)
- MONITORING WELL LOCATION (HYDRAULIC)
- USG EXTRACTION WELL LOCATION

GE AVIATION
EVENDALE, OHIO

SITE MAP WITH SELECTED MONITORING WELLS

N

0 200 400 800
Feet

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Figure 2
AF-11S & D Nested Series
Hydraulic Data Vs. EW-7S Pumping Rate

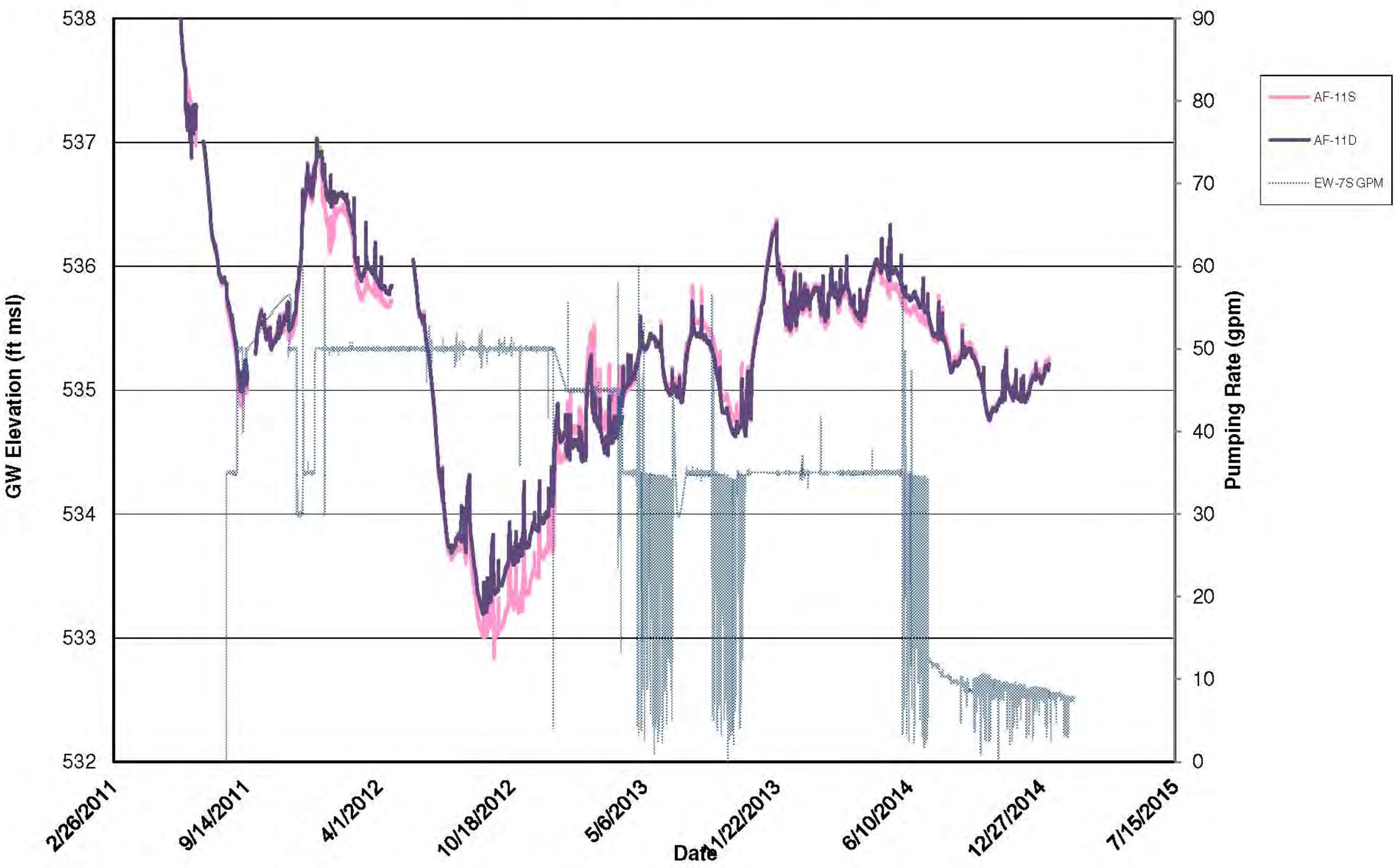


Figure 3
OSMW-4S & D Nested Series
Hydraulic Data Vs. EW-7S Pumping Rate

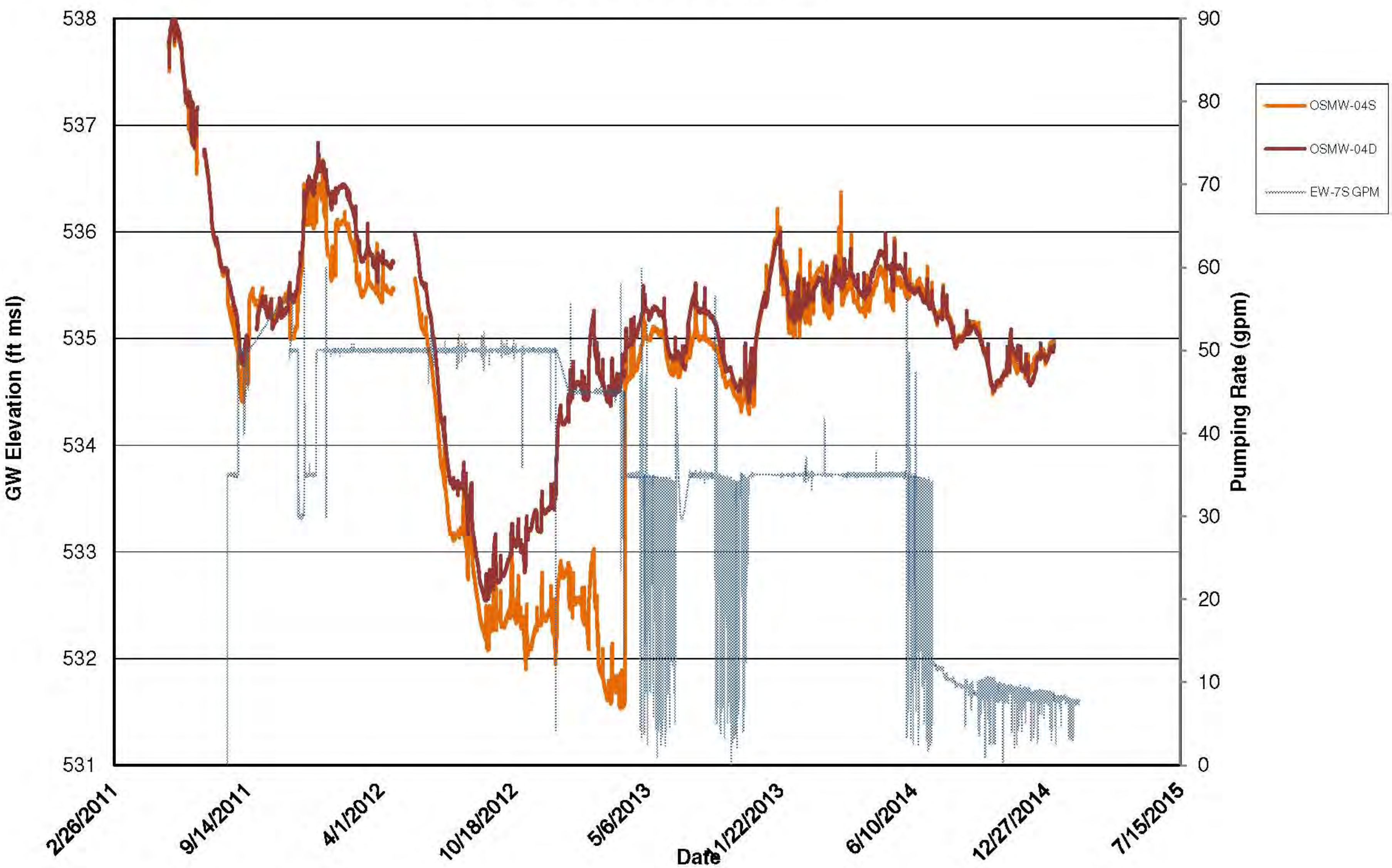


Figure 4
USG - EW-7S
Hydraulic Data Vs. Pumping Rate

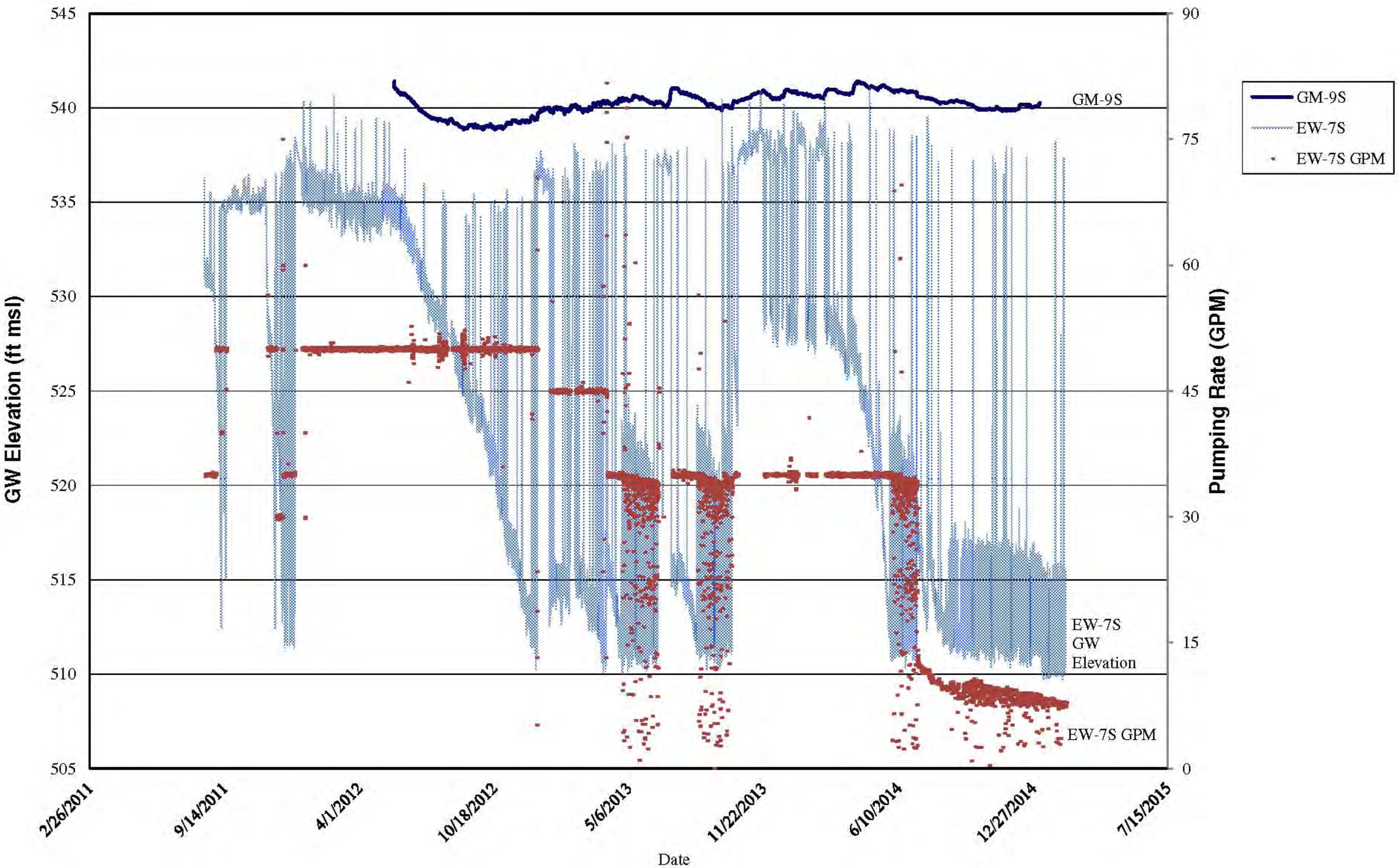


Figure 5
USG - EW-7S
Hydraulic and Analytical Data

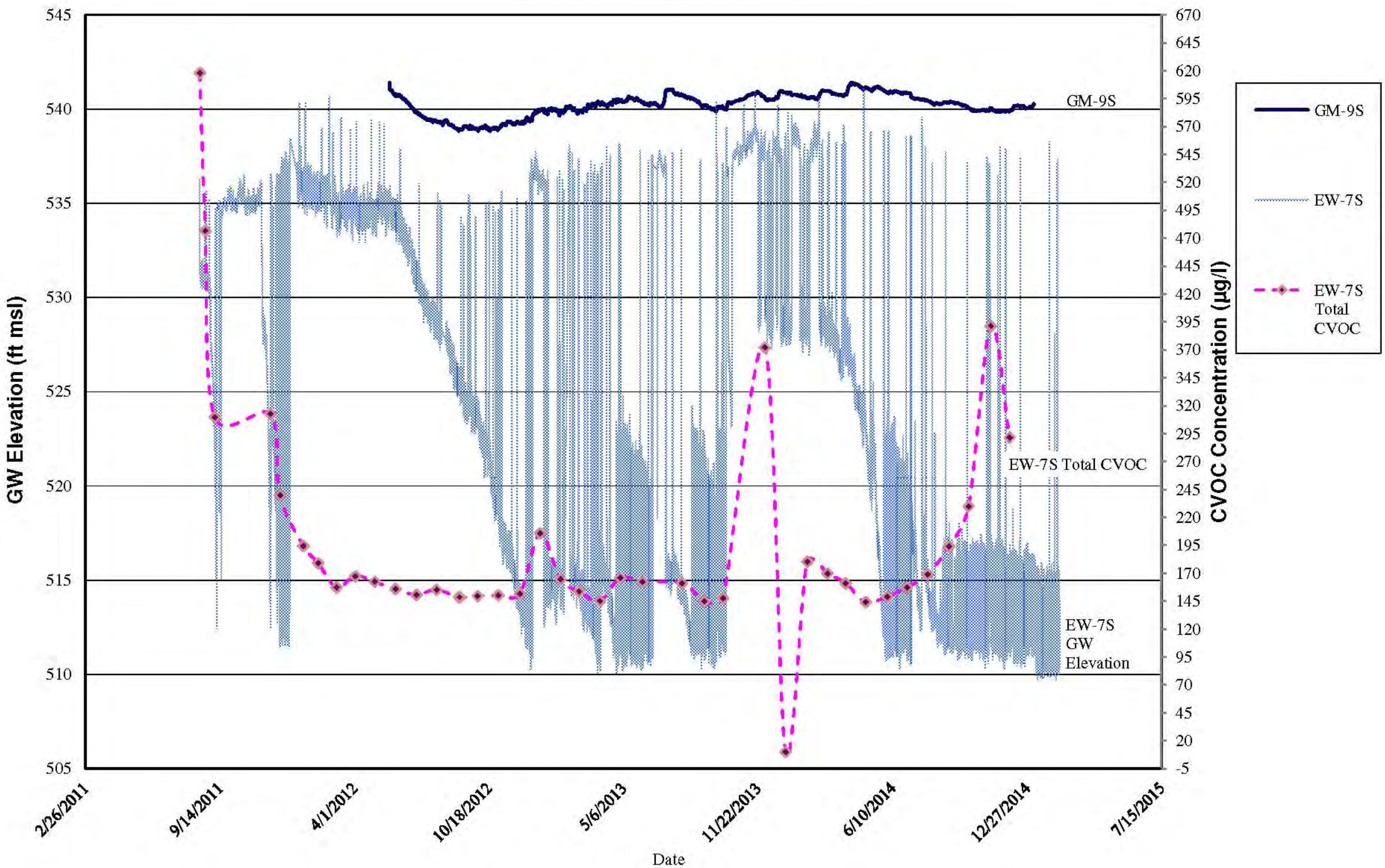


Figure 6
USG Monitoring Wells
Hydraulic and Analytical Data

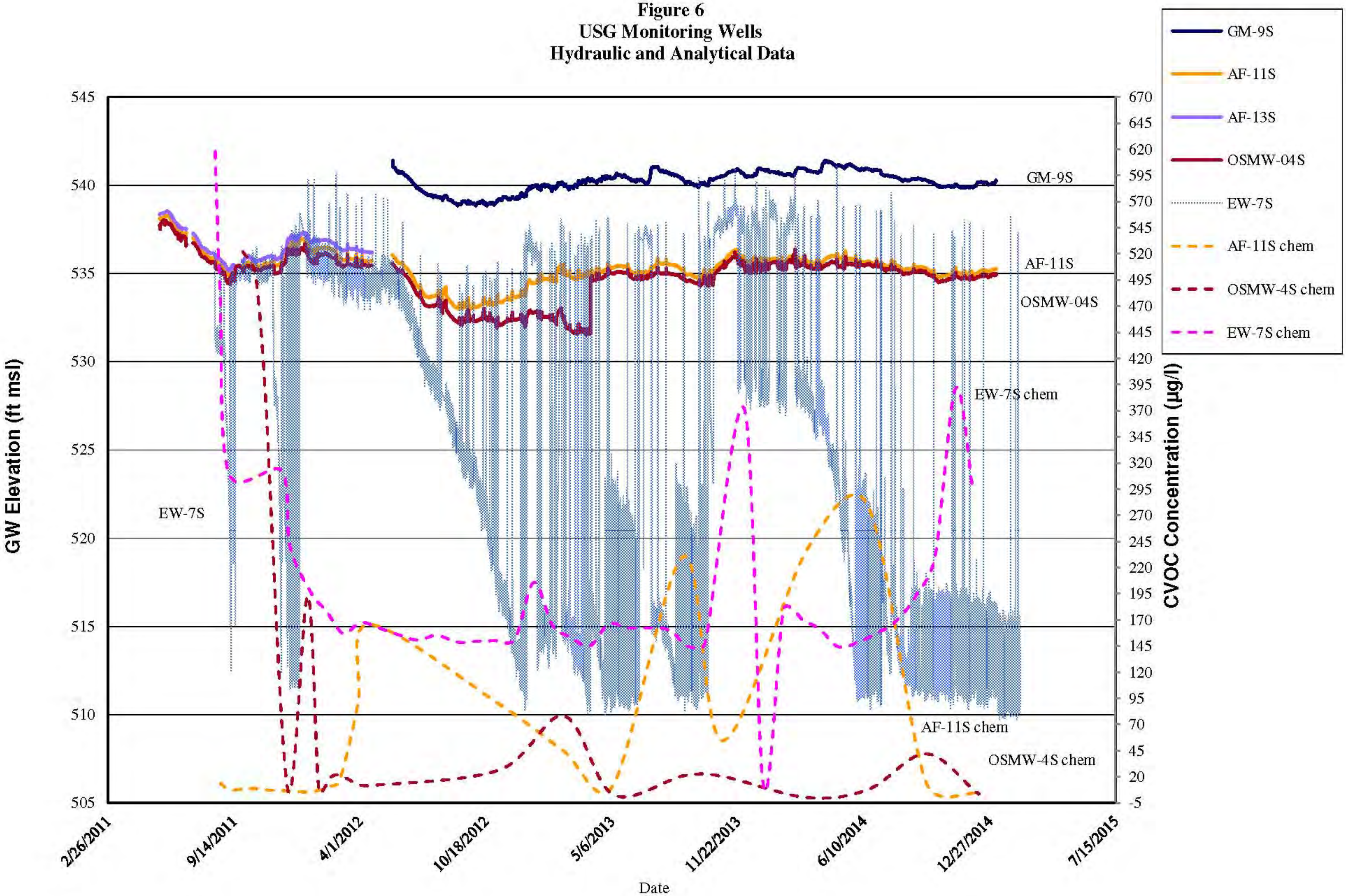


Figure 7
EW-7S and EW-8D
Pumping Rates Vs. EW-8D Analytical Data

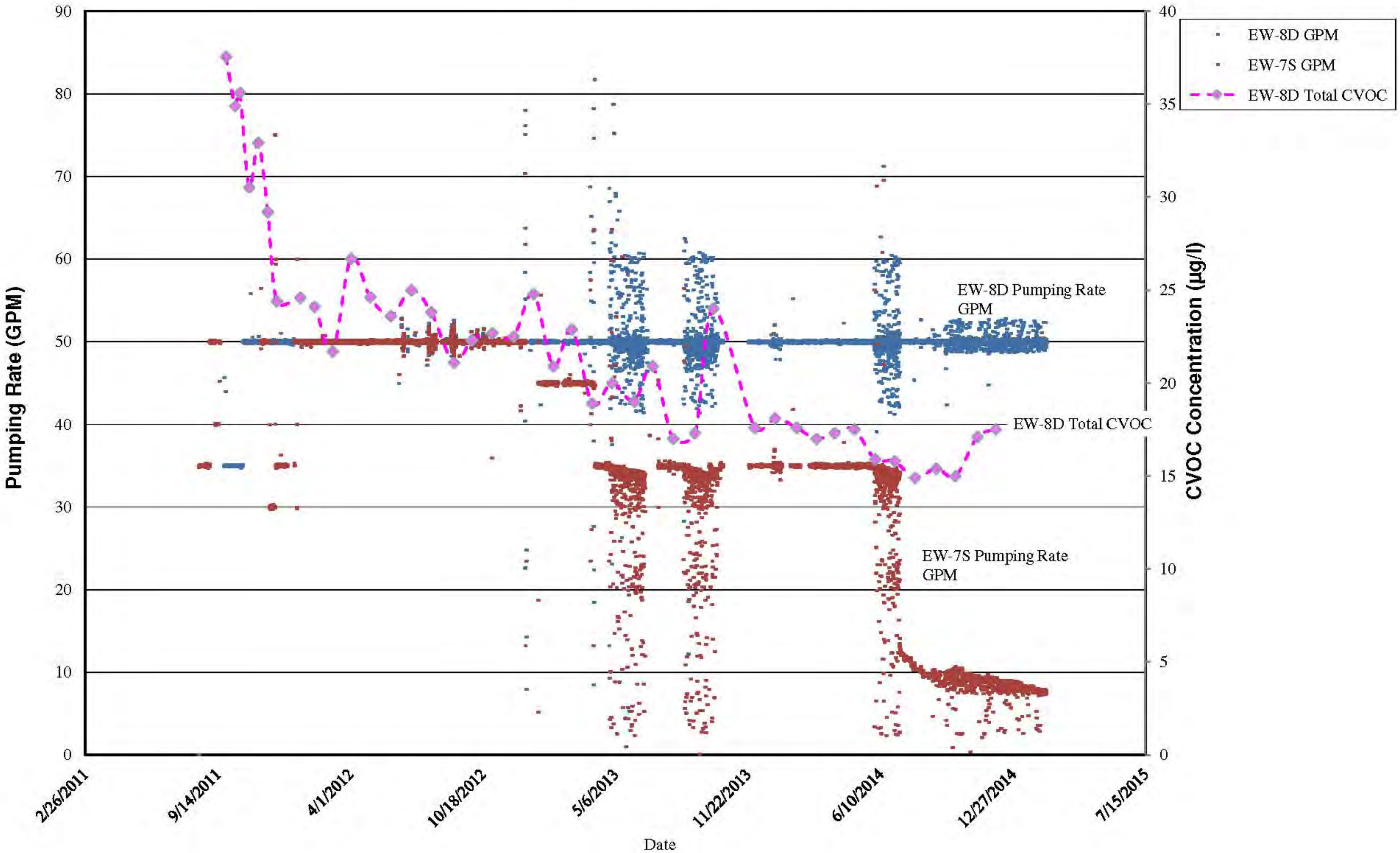


Figure 8
LSG Monitoring Wells
Hydraulic and Analytical Data

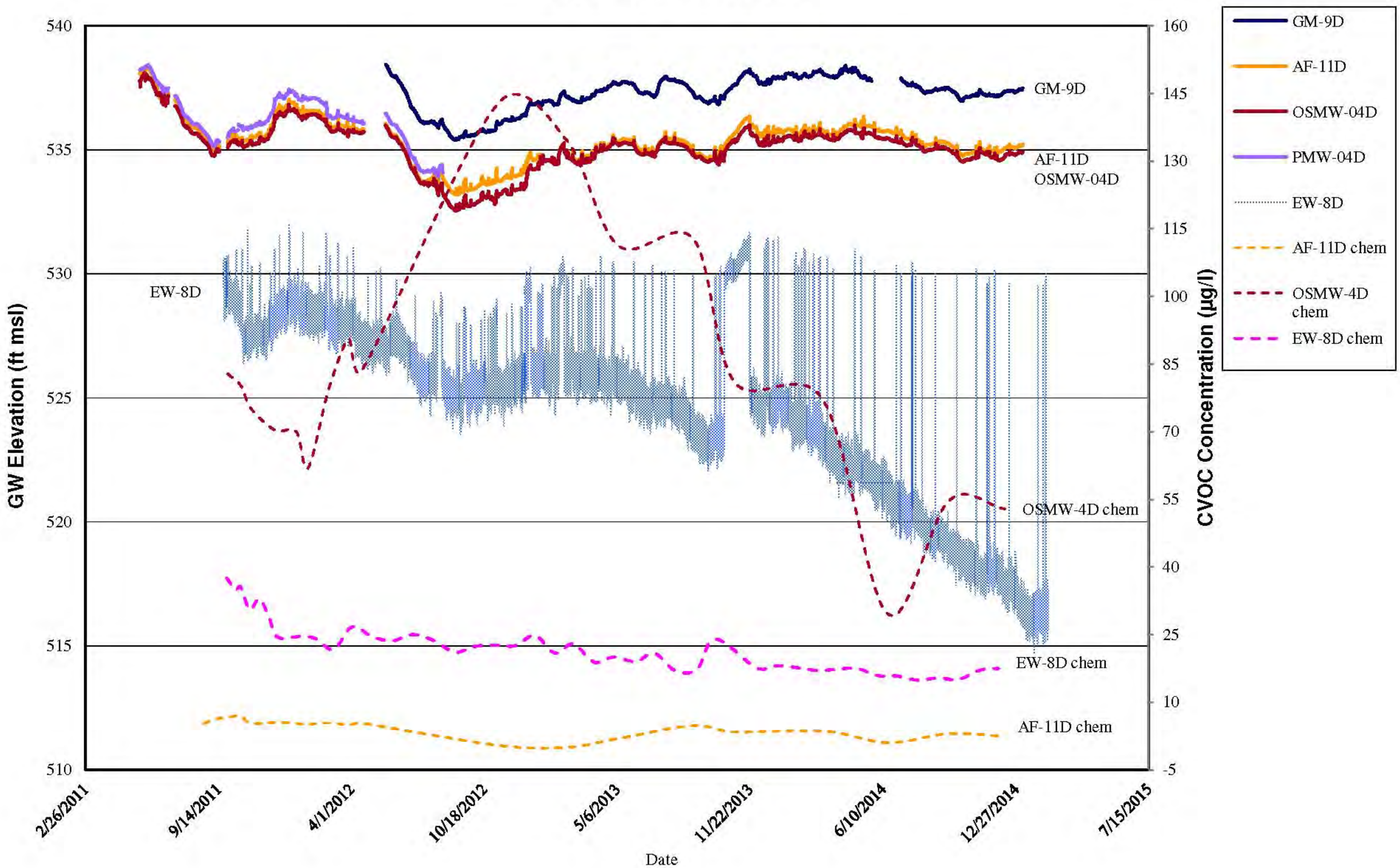
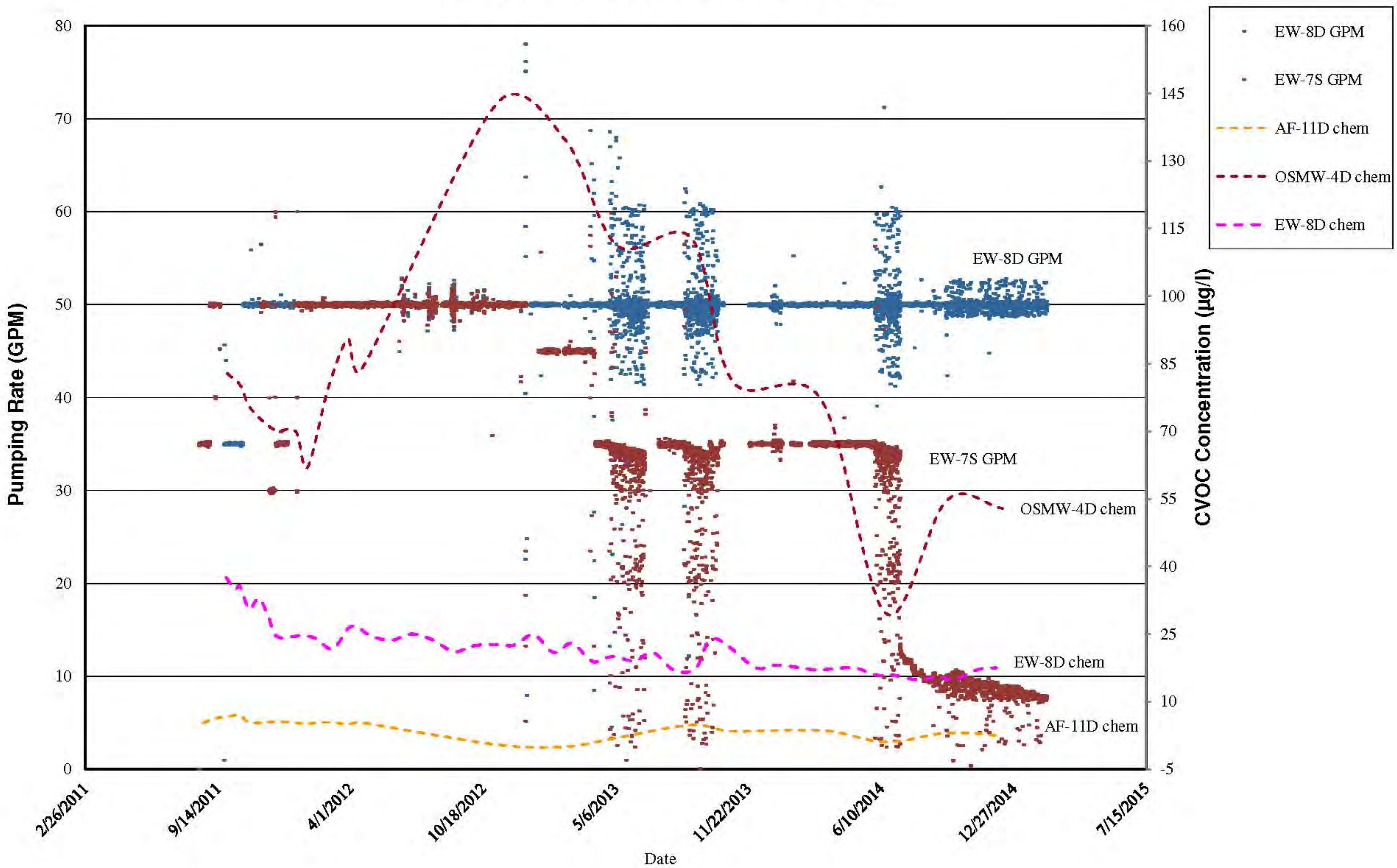


Figure 9
LSG Monitoring Wells
EW-8D & EW-7S Pumping Rates and Analytical Data



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